



Retraction notice

Retraction notice to "Super-hydrophilic MgO/NiCo<sub>2</sub>S<sub>4</sub> heterostructure for high-efficient oxygen evolution reaction in neutral electrolytes" [Appl. Catal. B Environ. 312 (2022) 121432]



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This article has been retracted: please see Elsevier Policy on Article Withdrawal (<https://www.elsevier.com/about/policies/article-withdrawal>).

This article has been retracted at the request of the Editors.

The Editors' decision to retract this article is due to significant issues that have been brought to the Editors' attention by a third party, which led to a thorough re-evaluation of the article by multiple members of the Editorial Board. That evaluation identified multiple critical issues that impact its reliability. The authors submitted a response to the third party comments as a part of that evaluation. The specific issues are listed below.

Issue 1: Durability claims. Figure 4 f in the original article shows 40 h chronoamperometric data that does not significantly decay (although there are dynamics in the plot), leading to claims of "excellent electrochemical stability". This is supported by sending the reader to Figure S15 where it is claimed that "the morphology of MgO/NCS-CC only has slight change compared with the initial morphology". However, it appears clear from Figure S15 that the catalyst has been removed from the surface during the process, making claims for physical claims of stability to be refuted and chemical claims of stability to be untested. The removal of the catalyst then makes the key results in Figure 4 f questionable as the remaining remarkable activity in the inset appears to be coming from a common substrate that has been reported before without such outstanding OER activity.

Issue 2: Catalyst composition. Reporting the true structure and determining the active phases of heterostructured materials is extremely difficult, but also extremely important. In this article, MgO is first synthesized onto carbon cloth, then a layer of nickel cobalt oxide is added.

Next, the resulting material is placed in an autoclave with thiocacetamide, and the final material is claimed to be MgO/NiCo<sub>2</sub>S<sub>4</sub>. The authors show EDS, XPS and XRD data to support the claim. However, the EDS data in Figure 1k does not show the homogeneous presence of Mg. The EDS also shows a very large excess of oxygen and sulfur, much more than would be expected from the stoichiometry. Although EDS is known to be difficult to use to quantify lighter elements, this is a weakness. Also, oxygen is co-located everywhere, suggesting that the nickel cobalt phase is still highly oxidized, not only in the sulfide form. The XPS data fitting in Figure 2d shows a fit peak for MgO, but close inspection of the figure appears to show only a noisy response, suggesting that such a fitting is not supported by the data. Lastly, the XRD patterns do likely show the presence of MgO (with a peak at ~42.5° in Figure S1a), however, it is not present in sufficient amount that would support its significant presence after further synthesis steps (MgO is likely to dissolve given the pH and temperature conditions) to make an extensive heterostructure that is reported by the author to be critical for the exceptional OER activity. Hence, it could not be confirmed that the claimed MgO/NiCo<sub>2</sub>S<sub>4</sub> heterostructure was indeed present.

The Editors would like to clearly state that there is no evidence that the authors intended to misrepresent their findings or to deceive the readers.

The Editors offer sincerest apologies to the readers of the journal for any confusion or inconvenience that may have resulted from the publication of this article and they appreciate the efforts and support of the editorial board and the reviewers who contributed to the evaluation of this article.

DOI of original article: <https://doi.org/10.1016/j.apcatb.2022.121432>.

<https://doi.org/10.1016/j.apcatb.2023.123145>

Available online 22 August 2023  
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